

CONTRIBUTIONS TO THE BRYOPHYTE FLORA OF TURKEY

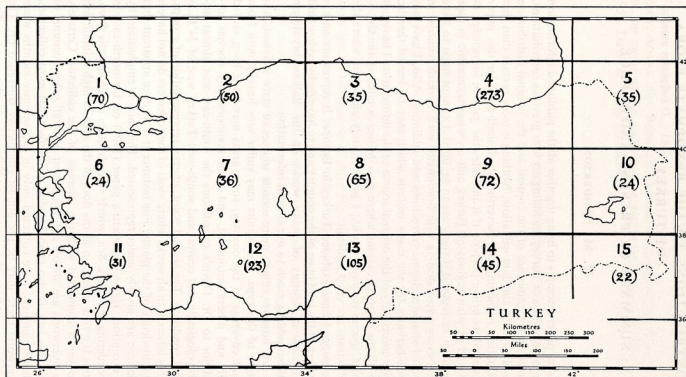
V: SUMMARY OF PRESENT KNOWLEDGE

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This present paper attempts to bring together all the published information on the bryophyte flora of Turkey, including my four previous contributions, and to assess the significance of the content and the internal distribution of the flora so far as the data will allow. Nothing is more certain than that the information is incomplete. Nevertheless, I shall consider this paper to have served its prime purpose if it indicates the gaps in knowledge of the flora and in what regions of Turkey and on what taxonomic groups attention must be focused if these are to be filled. I cannot hope to have discovered every paper dealing with bryophytes with Turkish records; in this respect I should welcome corrections and additions. Also, I have not scrutinized herbaria for the many records which may be buried therein. Due to the uncertainty of the original source of the information I have not included all the many occasions where Asia Minor is cited in the distribution of a species in major works; I prefer to rely on papers where the exact collections are cited in detail.

In this paper I have excluded Turkey in Europe. It represents only a small portion of the land mass of the country and to have included it would have necessitated scrutiny of many works on the Balkan bryophyte flora without adding much to our overall information.

There are, however, much more serious sources of error inherent in a compilation of this type. The results may suffer very heavily both from insufficient coverage of the country, some areas may have been visited repeatedly and others untouched, and from taxonomically uneven collecting. Prior to Dr. Davis's expeditions the south-east was almost unknown bryologically and central and south-west Turkey west of 34°E. is still in that condition. The second point, uneven representation of groups, is probably inherent in all works where most of the collectors do not have a working knowledge of the plants. For instance it is at once apparent that the Hepaticae are grossly under-represented. This lack is emphasized by the one exception, Handel-Mazzetti's paper (1909) on the north-eastern corner bordering the Black Sea, which records quite a rich hepatic flora. In part this is a true reflection of the flora of the area of high rainfall, but it is also surely connected with the interests of the collector. Certainly the leafy liverworts are almost entirely absent from all other accounts of the flora. This lack is also probably due to the fact that most collectors, being phanerogamists, have collected only in the summer months when what liverworts there may be are almost completely shrivelled up. The same factor probably explains certain deficiencies in the mosses. For instance many of the small species inhabiting bare soil, belonging to the genera *Seligeria*, *Phascum* and *Pottia*, are either totally absent or



The distributional grid (squares 1-15) used in this paper. The numbers in brackets are the total number of species and varieties of bryophytes recorded for each square.

disproportionately represented—after all they are usually only found by bryologists browsing on all fours.

The distribution grid map used to divide up the country calls for some explanation. Fifteen squares are defined by the longitude lines at 4° intervals and the latitude lines at 38° and 40°N. Although these areas are at first sight rather crude they in fact coincide roughly with the major floristic regions of the country. The flora of the squares 1–5 along the Black Sea coast is predominantly Colchic in its affinities, with here and there a coastal belt of Mediterranean affinity. The flora of the western and southern seaboard (squares 6 and 11–13) is typically Mediterranean. The central plateau (squares 7–10 and 14–15) is occupied by a steppe vegetation of a predominantly Irano-turanian type. These aspects of the vegetation and their distribution are to be dealt with fully by my colleague Dr. P. H. Davis to whom I am indebted for many discussions on the subject. Given such a distribution of the higher plant vegetation the question at once arises is it possible to divide the bryophyte flora into 'elements' in the same way? Even the most cursory examination shows that it is not. This result is in agreement with the experience of most workers who have studied the distribution of bryophytes. Taking the whole of the circumboreal region there is a very large pool of widely distributed species which occur wherever micro-climatic conditions are suitable. Probably these conditions need be suitable only during a few months of the year, usually in early spring. Thus taken as a whole the bryophytes like the ferns do not seem to present the complicated patterns in Europe and neighbouring areas as the higher plants; certainly from the information available no patterns of subspecific differentiation comparable to that of some phanerogamic genera in Turkey are evident. These conclusions, however, rest upon information gathered by classical taxonomic methods. It may well be that, as Steere (1954) and others have very rightly pointed out in another context, the apparent widespread distribution of bryophyte taxa would appear in a very different light if other criteria including cytology could be adequately investigated.

The convenience of dividing Turkey into these fifteen areas lies of course in the fact that they delimit areas which accord fairly well in physical properties. Thus the five northern squares 1–5 contain mostly acid rocks, especially at the eastern end in the provinces from Giresun to Artvin. Within the four areas 2–5 the rainfall is very high on the northern side of the watershed reaching at least fifty inches in some localities. Furthermore this rainfall is spread fairly uniformly throughout the year. These factors together have permitted the survival of many species of atlantic affinity whose existence depends upon high humidity and acid substrate; good examples of these are *Campylopus atrovirens*, *Hookeria lucens*, *Scelopodium illecebrum*, *Porella platyphylla*. Much of this element continues eastwards in the similar conditions prevailing in the Caucasus and in the Elburz mountains of Northern Iran. Similarly, some predominantly Caucasian species penetrate westwards and reach their westernmost limit in the Pontic mountains, for example *Pleuropus euchloron* reaches its westernmost limit in the mountains near Hendek (Czeczott, 1939). A few of these species of the Pontus are widely disjunct; *Hyocomium flagellare* stretches westwards from Transcaucasia to the neighbourhood of Trabzon and does not reappear until Corsica is reached to the west, whence it has a

fairly wide distribution of a typically atlantic type. The two hepatics *Lejeunea patens* and *Jubula hutchinsiae* have similar distributions. Also within this pontic region, embracing all the northern squares, there occurs a richly developed woodland bryophyte flora associated with the *Fagus orientalis*, *Abies nordmanniana* and *Picea orientalis* forests. Here occur most of the species listed by Herzog in his study of the distribution of the Bryophyta (1926), as typical of Eurasian woodlands. These include *Rhytidiadelphus triquetrus*, *R. squarrosus*, *Plagiothecium sylvaticum*, *Brachythecium rutabulum*, *Dicranum scoparium*, *D. majus*, *Mnium rostratum* and *M. affine*, *Polytrichum formosum*, *Plagiochila asplenioides*, *Lepidozia reptans*, *Porella platyphylla*, *Frullania dilatata* and *Radula complanata*. All these, except *Brachythecium rutabulum* (7 and 14) and *Mnium affine* (8), are entirely confined to the northern squares 1-5. Another group of species with a similar distribution, but in this instance not so obviously linked with the woodlands, is that whose extra-Turkish distribution is primarily Atlantic or Atlantic-Mediterranean according to Herzog's classification. The most obvious of these are *Tetraphis brownianum*, *Campylopus atrovirens*, *Fissidens crassipes*, *Tortella flavovirens*, *Funaria calcarea*, *Hookeria lucens*, *Scleropodium illecebrum*, *Eurynchium prae-longum* var. *stokesii*, *Sematophyllum demissum* and *Plagiothecium undulatum*. Most of these species are confined to the Black Sea region but a few also occur in the southern squares and these latter, e.g. *Tortella flavovirens* and *Funaria calcarea*, are not very strongly indicative of atlantic conditions.

In marked contrast to the distribution of these groups, is that of the group of species which Herzog treats as a true mediterranean xerothermic element, a notable feature of which, in contrast with the atlantic groups, is the rarity of epiphytic species. Furthermore the distribution is based on the circum-mediterranean countries, although some penetrate further north in warmer areas and often favour base-rich soils. This element is of much wider distribution in Turkey than the preceding atlantic groups, but the interpretation of its distribution is hampered by the relative lack of information about the central plateau squares. Present data indicate that almost half this element is confined to the marginal squares 1-5, 6 and 11-13; many of these are restricted to the southern five 11-15 including *Tortella nitida*, *Bartramia stricta*, *Timmiella anomala*, *T. barbuloidea* and *Scorpiurium deflexifolium*. Those restricted to the seaboard squares include *Pleurochaeta squarrosa*, *Scorpiurium circinatum*, *Pterogonium gracile* and *Eucladium verticillatum*. Those of this group which also penetrate the central plateau squares are *Tortula inermis*, *Crossidium squamigerum* and its variety *pottioideum* and *Camptothecium lutescens*. In examining the distribution of this group, in which many species are markedly basiphilic, the fact that most of the limestone in Turkey occurs in the southern half of the country must be borne in mind and undoubtedly the distribution of many species is limited by this fact.

The species which can be considered as forming a steppe element in the flora are few in number. In Turkey they are confined to the central areas (6-10) and their extra-turkish distributions follow areas of irano-turanian climate in Iran and Iraq, North Africa and central Spain. The best examples are *Tortula desertorum* and *Tortula papillosissima*.

There remains a small group of endemic species and varieties. Most of these are known only from the type collections, which I have not seen, and certainly many require re-evaluation. Those in this category are *Anoetangium handelii*, *Grimmia cucullata*, *Funaria handelii*, *Tayloria lingulata* var. *acutifolia*, *Mniobryum latifolium*, *Philonotis calcarea* var. *orthophylla* and var. *seriatifolia*, *Orthotrichum rupestre* var. *kurdicum*, *Amblystegium kurdicum*, *Rhynchostegium hausknechtii*, *Nardia handelii*, *Nardia handelii* var. *flaccida*, *Nardia subtilissima* and *Nardia lignicola*.

In the enumeration I have been forced to adopt the most generally accepted modern epithets without citing all the synonyms under which the records have been published, the list would have been too cumbersome otherwise. However, it is always possible to get back to the original source of my information by the system of reference adopted and any mistakes due to the extensive use of synonymy can be corrected. In many cases I have left in species and especially varieties whose validity is perhaps doubtful rather than lump them. These difficulties can only be resolved by examination of the collected material.

In the tables that follow, the grid square number, as shown on the map, is given at the head of each column and against each species a number occurs in the appropriate grid-square column from which it has been recorded. This number refers to the authority for the record, according to the following list.

No.	Reference	No.	Reference
1	Henderson & Muirhead, 1955	10	Penther & Zederbauer, 1905
2	Henderson, III, 1958	11	Reimers, 1927
3	Henderson, II, 1957	12	Czeczott, 1939
4	Henderson, IV, 1961	13	Handel-Mazzetti, 1909
5	Fritsch, 1900	14	Bornmüller, 1931
6	Schiffner, 1913	15	Juratzka & Milde, 1870
7	Schiffner, 1897	16	Wettstein, 1889
8	Schiffner, 1908	17	Jovet-Ast, 1957
9	Schiffner, 1896	18	Bornmüller, 1908

FISSIDENTACEAE

Fissidens incurvus Starke ex Web. & Mohr
 — *crassipes* Wils. var. *submarginatus* Fleisch. & Warnst.
 — *taxifolius* Hedw.
 — *cristatus* Wils.

DICRANACEAE

Pleuridium subulatum (Hedw.) Lindb.	.	.	.	.
Ditrichum flexicaule (Schleich.) Hampe	.	.	.	.
— var. densum B.S.G.	.	.	.	.
Distichium capillaceum (Hedw.) B.S.G.	.	.	.	.
— inclinatum (Hedw.) B.S.G.	.	.	.	.
Ceratodon purpureus (Hedw.) Brid.	.	.	.	.
Seligeria recurvata (Hedw.) B.S.G.	.	.	.	.
Blindia acuta (Hedw.) B.S.G.	.	.	.	.
Dicranella varia (Hedw.) Schimp.	.	.	.	.
— subulata (Hedw.) Schimp.	.	.	.	.
— heteromalla (Hedw.) Schimp.	.	.	.	.
— var. interrupta (Hedw.) B.S.G.	.	.	.	.
Dichodontium pellucidum (Hedw.) Schimp.	.	.	.	.
— var. flavescens (Turn.) C. Jens.	.	.	.	.
Dicranodontium denudatum (Brid.) Brit.	.	.	.	.
Dicranoweissia cirrata (Hedw.) Lindb.	.	.	.	.
— crispula (Hedw.) Lindb.	.	.	.	.
Dicranum starkei Web. & Mohrf. subdenticulatum Limpr.	.	.	.	.
— montanum Hedw.	.	.	.	.
— fuscescens Turn.	.	.	.	.
— majus Turn.	.	.	.	.
— bonjeani De Not. var. juniperifolium (Sendtn.) Braithw.	.	.	.	.
— var. polycladum B.S.G.	.	.	.	.
— scoparium Hedw.	.	.	.	.
— var. polycarpum Breidl.	.	.	.	.
— rugosum Brid.	.	.	.	.

Grid square	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Campylopus atrovirens</i> De Not.	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Paraleucobryum longifolium</i> (Hedw.) Loeske	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
— <i>sauteri</i> (Schimp.) Loeske	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
— <i>fulvum</i> (Hook.) Loeske	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
— <i>enerve</i> (Thed.) Loeske	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Leucobryum glaucum</i> (Hedw.) Schimp.	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
— <i>albidum</i> (Brid.) Lindb.	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
<i>Encalypta alpina</i> Sm.	-	7	-	-	-	-	-	-	6	-	-	-	-	6	-
— <i>vulgaris</i> Hedw.	14	-	-	-	4	-	14	-	15	-	2	2	4	14	-
— <i>streptocarpa</i> Hedw.	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-
— <i>intermedia</i> Jur.	-	-	-	-	-	-	-	15	15	-	-	-	-	-	-
POTTIACEAE															
<i>Tortula ruralis</i> (Hedw.) Crome	-	2	-	1	-	-	2	1	6	3	2	2	4	4	3
— <i>ruraliformis</i> (Besch.) Dix.	-	-	-	-	-	8	14	-	6	-	-	-	-	-	-
— <i>norvegica</i> (Web.f.) Wahl. ex Lindb.	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-
— <i>intermedia</i> (Brid.) Berk.	14	-	-	-	4	8	-	-	15	3	-	-	4	4	-
— <i>papillosissima</i> (Copp.) Broth.	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-
— <i>desertorum</i> Broth. (including <i>T. bornmuelleri</i> Schiffn.)	-	-	-	-	-	8	14	-	6	-	-	-	-	-	-
— <i>handellii</i> Schiffn.	-	-	-	-	-	-	14	-	-	-	-	-	-	6	-
— <i>princeps</i> De Not.	-	-	-	-	-	-	-	-	-	-	-	-	16	4	-
— <i>alpina</i> (B.S.G.) Bruch.	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-
— <i>subulata</i> Hedw.	-	14	-	-	-	-	-	10	-	-	-	2	4	-	-
— <i>obtusifolia</i> Schleich.	-	-	-	9	-	-	-	-	-	-	-	-	4	-	-
— <i>inermis</i> Mont.	14	-	-	-	-	-	2	2	6	-	2	-	15	6	-
— <i>canescens</i> (Bruch) Mont.	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
— <i>muralis</i> Hedw.	5	-	-	8	-	-	14	14	15	-	-	-	4	4	-
— var. <i>aestiva</i> (Beauv.) Brid.	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
— var. <i>rupestris</i> Schultze	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Desmatodon latifolius</i> (Hedw.) B.S.G.	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-
— var. <i>muticus</i> Brid.	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-

<i>Aloina rigida</i> (Hedw.) Kindb.	6	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
— var. <i>pilifera</i> B.S.G.	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
— <i>ambigua</i> (B.S.G.) Limpr.	-	-	-	-	-	-	-	-	-	-	-	15	2	-	-	-
<i>Crossidium squamigerum</i> (Viv.) Jur.	14	-	7	-	-	-	-	2	15	-	-	-	-	6	-	-
— var. <i>pottioideum</i> (De Not.) Moenk.	-	-	-	-	-	-	4	-	6	-	-	-	-	6	6	-
<i>Pterygoneurum ovatum</i> (Hedw.) Dix.	-	-	7	-	-	-	14	10	15	-	-	-	-	15	15	-
<i>Merceya acutiuscula</i> (Lindb.) Chen	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
<i>Stegonia latifolia</i> (Schwaegr.) Vent.	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
<i>Pottia lanceolata</i> (Hedw.) C.M.	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
— <i>crinita</i> Wils.	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
— <i>starkeana</i> (Hedw.) C.M.	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-
<i>Cinclidotus nigricans</i> (Brid.) Dix.	-	-	-	-	-	-	-	-	6	-	-	2	-	-	-	2
<i>Barbula convoluta</i> Hedw.	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-
— var. <i>commutata</i> (Jur.) Husn.	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-
— <i>unguiculata</i> Hedw.	14	-	13	1	-	-	14	-	-	-	-	-	-	-	-	-
— <i>revoluta</i> Brid.	-	14	-	-	-	-	-	-	6	-	-	-	-	-	6	-
— <i>acuta</i> (Brid.) Brid.	-	14	-	-	-	-	14	-	-	-	-	-	-	-	-	-
— <i>fallax</i> Hedw. var. <i>crispula</i> Warnst.	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-
— <i>spadicea</i> Mitt.	-	-	-	-	-	-	-	-	6	-	-	-	-	-	6	-
— <i>rigidula</i> (Hedw.) Mitt.	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-
— <i>trifaria</i> (Hedw.) Mitt.	-	-	-	1	-	-	-	-	-	-	-	2	-	6	-	3
— <i>tophacea</i> (Brid.) Mitt.	11	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-
— <i>cylindrica</i> (Tayl.) Schimp.	6	-	13	13	-	-	-	-	-	-	2	-	-	-	-	-
— <i>vinealis</i> Brid.	14	-	-	-	-	-	4	15	6	-	2	2	-	6	6	-
— <i>recurvirostris</i> (Hedw.) Dix.	-	-	-	-	3	-	-	10	15	-	-	-	-	1	-	3
" <i>Didymodon afer</i> (C.M.) Broth."	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gymnostomum aeruginosum</i> Sm.	-	-	-	13	-	-	-	2	6	-	-	-	-	-	-	3
— <i>calcareum</i> Nees & Hornsch.	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2	-
— var. <i>viridulum</i> (Brid.) B.S.G.	6	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-
<i>Anoetangium handelii</i> Schiffn.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
<i>Eucladium verticillatum</i> (With.) B.S.G.	-	-	-	13	-	-	-	-	-	-	2	-	-	6	-	-
<i>Tortella fragilis</i> (Hook. & Wils. ex Drumm.) Limpr.	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-
— <i>tortuosa</i> (Hedw.) Limpr.	2	14	-	1	4	-	-	-	-	-	2	2	-	4	-	-
— <i>nitida</i> (Lindb.) Broth.	-	-	-	-	-	-	-	-	-	-	2	-	-	4	-	-

	Grid square														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Tortella flavovirens</i> (Bruch) Broth.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
— <i>cylindrica</i> (Bruch) Loeske	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
<i>Pleurochaete squarrosa</i> (Brid.) Lindb.	-	14	-	-	-	8	-	-	-	-	-	-	6	-	-
<i>Trichostomum crispulum</i> Bruch	-	-	-	13	-	-	-	-	-	-	2	2	4	-	-
— <i>brachydontium</i> Bruch	11	-	-	13	-	-	4	-	-	-	2	-	4	-	-
<i>Timmiella barbuloidea</i> (Brid.) Moenk.	-	-	-	-	-	-	-	-	-	-	2	2	4	-	-
— <i>anomala</i> (B.S.G.) Limpr.	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-
<i>Weissia controversa</i> Hedw.	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
— <i>crispata</i> (Nees & Hornsch.) Jur.	-	-	13	13	-	-	-	-	6	-	-	-	-	-	-
— <i>tortilis</i> (Schwaegr.) C.M.	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-
— <i>leptocarpa</i> Schimp.	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-
— <i>wimmeriana</i> (Sendt.) B.S.G. var. <i>muralis</i> (Spruce)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brid.	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
— <i>microstoma</i> (Hedw.) C.M.	6	-	-	-	-	-	-	2	-	-	-	-	4	-	-
GRIMMIACEAE															
<i>Coscinodon cribrosus</i> (Hedw.) Spruce	-	-	-	1	-	-	-	-	6	-	-	-	-	-	-
<i>Grimmia apocarpa</i> Hedw.	-	2	-	1	-	-	-	-	6	-	-	-	4	6	-
— var. <i>gracilis</i> (Schwaegr.) Web. & Mohr.	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
— var. <i>brunnescens</i> (Limpr.) Moenk.	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-
— <i>conferta</i> Funck	-	-	-	13	-	-	-	10	15	-	-	-	2	15	-
— <i>anodon</i> B.S.G.	-	-	-	-	-	-	-	15	15	2	-	10	4	6	2
— <i>cucullata</i> Henderson	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
— <i>flaccida</i> (De Not.) Lindb.	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
— <i>plagiopoda</i> Hedw.	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-
— <i>crinita</i> Brid., as <i>G. sinaica</i> (Hampe) B.S.G.	-	-	-	-	-	-	-	15	15	-	-	-	-	15	-
— <i>commutata</i> Hüben.	-	-	-	-	4	-	14	10	6	-	-	-	4	4	3
— <i>laevigata</i> (Brid.) Brid.	5	-	-	1	-	-	14	10	15	-	-	-	4	-	3
— <i>alpestris</i> Schleich.	-	-	-	4	-	-	-	10	-	-	-	-	-	-	-
— <i>subcaespiticia</i> Schiffn.	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-
— <i>tergestina</i> Tømm.	-	-	-	-	-	-	-	-	6	-	-	-	4	4	-
— <i>ovalis</i> (Hedw.) Lindb.	-	-	-	-	4	-	-	10	-	-	-	-	4	-	-

Grimmia elongata Kaulf.	-	-	-	4	-	-	-	-	-	-	-	-	-	-
pulvinata (Hedw.) Sm.	4	2	-	4	-	8	14	2	15	-	2	-	4	4
var. africana (Hedw.) Dix.	14	14	-	-	-	-	-	-	-	-	-	-	-	-
orbicularis Bruch	14	-	-	-	-	-	14	-	6	-	-	-	4	6
var. persica Schiffn.	-	-	-	-	-	-	-	-	6	-	-	-	-	6
funalis (Schwaegr.) Schimp.	-	-	-	4	4	-	-	-	-	-	-	-	-	-
trichophylla Grev.	-	-	-	-	-	-	-	-	-	-	2	4	4	-
subsp. meridionalis (Schimp.) Loeske	-	-	-	-	8	-	-	-	-	2	-	-	-	-
hartmanii Schimp.	-	-	-	1	-	-	-	-	-	-	-	4	-	-
decipiens (Sultz) Lindb.	5	-	-	1	-	-	-	-	-	-	-	4	-	-
elator Bruch	-	-	-	1	4	-	-	-	-	-	-	-	-	-
Racomitrium aciculare (Hedw.) Brid.	-	-	-	13	-	-	-	-	-	-	-	-	-	-
aquaticum (Brid.) Brid.	-	-	13	-	-	-	-	-	-	-	-	-	-	-
heterostichum (Hedw.) Brid.	-	-	-	4	-	-	-	-	-	-	-	-	-	-
var. alopecurum Hüben.	-	-	-	1	-	-	-	-	-	-	-	-	-	-
var. gracilescens B.S.G.	-	-	-	13	-	-	-	-	-	-	-	-	-	-
canescens Brid.	-	-	-	4	-	-	-	-	4	-	-	-	-	-
var. ericoides B.S.G.	-	-	-	1	-	-	-	-	-	-	-	-	-	-
lanuginosum (Hedw.) Brid.	-	-	-	11	-	-	-	-	-	-	-	-	-	-
FUNARIACEAE														
Funaria muehlenbergii Turn.	-	-	-	-	-	-	-	-	-	-	-	-	15	-
hygrometrica Hedw.	5	-	-	11	-	-	-	-	-	-	2	-	15	-
mediterranea Lindb.	-	-	-	-	-	-	-	-	15	-	-	-	15	-
anomala Jur.	-	-	-	-	-	-	-	-	-	-	-	-	15	-
handelii Schiffn.	-	-	-	-	-	-	-	-	6	-	-	-	-	-
Physcomitrium pyriforme (Hedw.) Brid.	-	-	-	11	-	-	-	-	-	-	-	-	-	-
SPLACHNACEAE														
Tayloria lingulata (Dicks.) Lindb. var. acutifolia Schiffn.	-	-	-	-	-	-	-	-	6	-	-	-	-	-
BRYACEAE														
Pohlia elongata Hedw.	-	-	-	13	-	-	-	-	-	-	-	-	-	-
cruda Lindb.	-	-	-	4	-	-	-	10	-	-	-	-	-	-

[illegible]

[illegible]

	Grid square														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AMBLYSTEGIACEAE															
<i>Cratoneuron filicinum</i> (Hedw.) Roth	9	14	—	—	—	—	14	2	6	2	—	—	1	—	3
— var. <i>fallax</i> (Brid.) Moenk.	14	—	—	9	—	—	—	—	—	3	—	—	—	—	—
— <i>commutatum</i> (Hedw.) Roth	—	14	—	—	—	—	14	—	6	3	—	—	—	—	3
— var. <i>falcatum</i> (Brid.) Moenk.	—	14	—	1	—	—	—	—	—	2	—	—	1	—	3
— <i>decipens</i> (De Not.) Loeske	—	—	—	9	—	—	—	—	—	2	—	—	—	—	3
— var. <i>napaeiforme</i> (Schiffn.) Podp.	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—
<i>Hygroamblystegium tenax</i> (Hedw.) Jennings	—	—	—	13	—	—	—	2	4	—	—	—	—	—	—
— <i>fluviatile</i> (Hedw.) Loeske	—	—	—	11	—	—	—	—	—	—	—	—	—	—	—
— f. <i>spinifolia</i> Moenk.	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—
<i>Amblystegium serpens</i> (Hedw.) B.S.G.	—	—	—	—	—	—	4	15	—	—	—	—	—	—	—
— <i>kurdicum</i> Schiffn.	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—
<i>Drepanocladus aduncus</i> (Hedw.) Warnst.	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—
— var. <i>kneiffii</i> (Hedw.) Moenk.	—	—	—	13	—	—	—	—	—	—	—	—	—	—	—
— <i>vernicosus</i> (Lindb.) Warnst.	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—
— <i>uncinatus</i> (Hedw.) Warnst.	—	12	—	1	4	—	—	—	—	—	—	—	—	—	—
— <i>capillifolius</i> (Warnst.) Roth var. <i>dichelymoides</i> Roth & Bock	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—
<i>Hygrohypnum luridum</i> (Hedw.) Jennings	—	—	—	13	—	—	—	—	—	—	—	—	—	—	—
— var. <i>subsphaericarpum</i> (Schleich.) C. Jens.	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
<i>Acrocladium cuspidatum</i> (Hedw.) Lindb.	—	—	—	7	13	—	—	—	—	—	—	—	—	—	3
— var. <i>pungens</i> Schimp.	—	—	—	13	—	—	—	—	—	—	—	—	—	—	—
BRACHYTHECIACEAE															
<i>Isoetecium myurum</i> (Brid.) Brid.	14	12	—	13	—	—	—	—	—	—	—	—	4	—	—
— var. <i>robustum</i> B.S.G.	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
— <i>striatulum</i> (Spruce) Kindb.	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
<i>Scorpiurium circinatum</i> (Brid.) Fleisch. & Loeske	—	—	—	13	—	—	—	—	—	—	2	—	15	—	—
— <i>deflexifolium</i> (Solms-Laub.) Fleisch. & Loeske	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
<i>Camptothecium sericeum</i> (Hedw.) Kindb.	2	12	—	9	4	8	—	2	6	2	2	2	4	4	—
— <i>lutescens</i> (Hedw.) B.S.G.	14	—	3	1	—	—	14	—	—	—	2	2	4	—	—
— var. <i>fallax</i> (Phil.) Breidl.	14	—	—	1	—	—	—	—	—	—	—	—	1	—	—
— <i>philippeanum</i> (Spruce) Kindb.	14	14	—	—	—	—	14	—	6	—	—	—	4	—	—

<i>Camptothecium aureum</i> B.S.G.	14	—	—	—	8	—	—	2	—	4	—
<i>Pleuropus euchloron</i> (Bruch) Broth.	—	12	—	13	—	—	—	—	—	—	—
<i>Brachythecium glareosum</i> (Bruch) B.S.G.	—	—	—	1	—	—	10	—	—	—	—
— <i>salebrosum</i> (Web. & Mohr) B.S.G.	—	14	—	13	—	—	—	—	—	4	—
— <i>rutabulum</i> (Hedw.) B.S.G.	—	12	—	13	—	—	15	—	—	—	6
— <i>rivulare</i> (Bruch) B.S.G.	14	—	—	1	—	—	14	6	2	—	—
— var. <i>turgescens</i> Warnst.	—	—	—	—	—	—	—	3	—	—	4
— <i>reflexum</i> (Starke) B.S.G.	—	—	—	13	—	—	—	—	—	—	—
— <i>velutinum</i> (Hedw.) B.S.G.	—	14	—	—	—	—	—	—	—	—	4
— <i>olympicum</i> Jur.	—	14	—	—	—	—	6	—	—	—	—
— <i>plumosum</i> (Hedw.) B.S.G.	—	—	13	—	—	—	—	—	—	—	—
— <i>populeum</i> (Hedw.) B.S.G.	14	—	—	13	—	—	—	—	—	—	—
— <i>collinum</i> (Schleich.) B.S.G.	—	—	—	—	—	1	6	2	—	—	3
— <i>trachypodium</i> (Funck) B.S.G.	—	—	—	—	—	—	—	2	—	—	—
<i>Scleropodium illecebrum</i> (Hedw.) B.S.G.	4	—	13	—	—	—	—	2	—	—	—
<i>Cirriphyllum crassinervium</i> (Tayl.) Loeske & Fleisch.	14	—	—	1	—	—	—	—	—	—	—
<i>Eurynchium striatum</i> (Hedw.) Schimp.	14	—	—	1	—	—	—	—	—	—	—
— <i>zetterstedtii</i> Störn.	—	—	—	1	4	—	—	—	—	—	—
— <i>pulchellum</i> (Hedw.) Jennings	—	—	—	13	—	—	10	—	—	—	—
— <i>praelongum</i> (Hedw.) Hobk.	—	—	—	—	—	—	15	—	—	—	—
— var. <i>stokesii</i> (Turn.) Hook.	14	—	—	11	—	—	—	—	—	—	—
— <i>swartzii</i> (Turn.) Curn.	—	—	—	—	—	—	—	—	—	4	—
— <i>riparioides</i> (Hedw.) Jennings	14	—	—	13	—	8	10	6	—	—	—
<i>Rhynchostegium hausknechtii</i> Jur. & Milde	—	—	—	—	—	—	—	—	—	15	—
<i>Rhynchostegiella tenella</i> (Dicks.) Limpr.	—	—	—	—	4	—	—	—	—	—	—
ENTODONTACEAE											
<i>Pterygandrium filiforme</i> Hedw.	—	—	—	—	—	—	—	—	—	4	—
<i>Pseudoscleropodium purum</i> (Hedw.) Fleisch.	11	2	—	13	—	—	—	—	—	—	—
<i>Pleurozium schreberi</i> (Brid.) Mitt.	—	12	—	1	4	—	—	—	—	—	—
PLAGIOTHECIACEAE											
<i>Isopterygium muellerianum</i> (Schimp.) Lindb.	—	—	—	1	—	—	—	—	—	—	—
<i>Plagiothecium latebricola</i> (Wils.) B.S.G.	—	—	—	1	—	—	—	—	—	—	—

ANTHOCEROTACEAE														
<i>Anthoceros punctatus</i> L.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— <i>laevis</i> L.	14	—	—	—	—	—	14	—	—	—	—	2	2	—
— <i>dichotomus</i> Raddi	—	—	—	—	—	—	18	—	—	—	—	—	—	—
TARGIONIACEAE														
<i>Targionia hypophylla</i> L.	—	—	—	—	—	—	8	—	—	—	—	2	—	4
REBOULIACEAE														
<i>Plagiochasma rupestre</i> (Forst.) Steph.	—	—	—	—	—	—	—	—	—	—	—	8	—	—
<i>Fimbriaria elegans</i> Spreng.	—	—	—	—	—	—	—	—	—	—	—	—	16	—
<i>Reboulia hemisphaerica</i> (L.) Raddi	—	—	—	—	—	—	14	—	2	—	—	—	—	4
— var. <i>macrocephala</i> Mass.	—	—	—	—	—	—	8	—	—	—	—	—	—	—
— var. <i>microspora</i> Schiffn.	—	—	—	—	—	—	8	—	—	—	—	—	—	—
<i>Grimaldia dichotoma</i> Raddi	—	—	—	—	—	—	8	—	—	—	—	—	—	—
<i>Conocephalum conicum</i> (L.) Dum.	5	—	—	—	—	—	—	—	10	—	—	2	—	—
MARCHANTIACEAE														
<i>Lunularia cruciata</i> (L.) Dum.	14	—	—	—	—	—	18	—	—	6	—	—	—	—
<i>Marchantia polymorpha</i> L.	5	—	—	—	—	—	4	—	—	—	—	—	—	16
— var. <i>alpestris</i> Nees	—	—	—	—	—	—	—	—	—	6	—	—	—	—
CLEVEACEAE														
<i>Clevea rousseliana</i> (Mont.) Leit.	—	—	—	—	—	—	—	—	10	—	—	—	—	—
RICCIACEAE														
<i>Riccia bischoffii</i> Hüb.	14	—	—	—	—	—	—	—	—	—	—	—	—	—
— <i>bifurca</i> Hoffm.	—	—	—	—	—	—	—	—	10	—	—	—	—	—
— <i>macrocarpa</i> Jack & Lev.	—	—	—	—	—	—	8	—	—	—	—	—	—	—
— <i>frostii</i> Aust.	—	—	17	—	—	—	—	—	—	—	—	—	—	—
OXYMITRACEAE														
<i>Oxymitra pyramidata</i> (Raddi) Bisch.	—	—	—	—	—	—	8	—	—	—	—	—	—	—

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